

DEP SPECIFICATION

QUALIFICATION OF NDT FOR FABRICATION INSPECTION

DEP 30.55.03.30-Gen.

September 2013

ECCN EAR99

DESIGN AND ENGINEERING PRACTICE



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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for qualification of a non-destructive testing (NDT) system to be applied during fabrication and construction.

Section 2 provides general definitions of the scope of NDT qualification and organizational requirements and responsibilities.

Section 3 provides the assessment process to identify the need for qualification of NDT systems.

Section 4 covers the implementation of a qualification.

This is a revision of the DEP of the same number dated February 2012; see (1.5) regarding the changes.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this DEP is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them. Any authorized access to DEPs does not for that reason constitute an authorization to any documents, data or information to which the DEPs may refer.

This DEP is intended for use in facilities related to oil and gas production, gas handling, oil refining, chemical processing, gasification, distribution and supply/marketing. This DEP may also be applied in other similar facilities.

When DEPs are applied, a Management of Change (MOC) process shall be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements could be more stringent than in this DEP, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regards to the safety, environmental, economic and legal aspects. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this DEP as closely as possible.

1.3 DEFINITIONS

1.3.1 General definitions

The **Contractor** is the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for it. The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

1.3.2 Specific definitions

Term	Definition
NDT Contractor	The party that carries out the NDT and is responsible for the delivery of the NDT-operators and necessary equipment and documentation for the NDT-qualification and production inspection, including the requested reporting.
NDT System	The combination of NDT technique, NDT equipment, Procedure, Personnel.
Fabrication Inspection	Inspection of equipment before it is placed in service.
Critical NDT	Criticality in this DEP is related to the fabrication of a piece of equipment, in a Project Quality Plan. Criticality is related to effect of NDT not performing as per requirements, impacting project schedule and the quality of the fabricated goods.
Technical Justification	A Technical Justification (TJ) is a collection of all the information which provides evidence about the capability of an NDT technique as applied to a specific component. It may include, for example, physical reasoning, mathematical modelling, results from test piece trials, field NDT results or experimental studies as appropriate to demonstrate that the considered NDT is adequate for the intended application.

1.3.3 Abbreviations

Term	Definition
ASME	American Association of Mechanical Engineers (see code references)
EN	European Norm
ENIQ	European Network for Inspection Qualification
FFS	Fitness for Service
FMECA	Failure Mode, Effect and Consequence Analysis
ISO	International Standards Organization (see code references)
ITP	Inspection and Test Plan
MFL	Magnetic Flux Leakage
MT	Magnetic Testing
NDE	Non-destructive Examination (also known as NDT)
NDT	Non-destructive Testing (also known as NDE)
POD	Probability of Detection
POFA	Probability of False Alarm (also called False Call Rate)
PQP	Project Quality Plan
PT	Penetrant testing
QA/QC	Quality Assurance/Quality Control
RT	Radiographic Testing
SCE	Safety Critical Element
TJ	Technical Justification
UT	Ultrasonic Testing

1.4 CROSS-REFERENCES

Where cross-references to other parts of this DEP are made, the referenced section or clause number is shown in brackets (). Other documents referenced by this DEP are listed in (6).

1.5 SUMMARY OF MAIN CHANGES

This DEP is full revision of the DEP of the same number dated February 2012. This has been a major rewrite and the changes are too numerous to list here.

1.6 COMMENTS ON THIS DEP

Comments on this DEP may be submitted to the Administrator using one of the following options:

Shell DEPs Online (Users with access to Shell DEPs Online)	Enter the Shell DEPs Online system at https://www.shelldeps.com Select a DEP and then go to the details screen for that DEP. Click on the "Give feedback" link, fill in the online form and submit.
DEP Feedback System (Users with access to Shell Wide Web)	Enter comments directly in the DEP Feedback System which is accessible from the Technical Standards Portal http://www.shell.com/standards . Select "Submit DEP Feedback", fill in the online form and submit.
DEP Standard Form (Other users)	Use DEP Standard Form 00.00.05.80-Gen. to record feedback and email the form to the Administrator at standards@shell.com .

Feedback that has been registered in the DEP Feedback System by using one of the above options will be reviewed by the DEP Custodian for potential improvements to the DEP.

1.7 DUAL UNITS

This DEP contains both the International System (SI) units, as well as the corresponding US Customary (USC) units, which are given following the SI units in brackets. When agreed by the Principal, the indicated USC values/units may be used.

2. GENERAL

2.1 BACKGROUND

Nondestructive testing (NDT) is an important part of the quality assurance process applied during the fabrication of new installations. Regulations of various kinds are in place to ensure that the NDT is performing adequately. High-level requirements are found in fabrication codes, industry standards on NDT, and professional requirements (NDT training, certification, etc). During implementation, NDT is subject to a Quality regime to ensure compliance with the requirements for testing.

A large proportion of NDT used during fabrication inspection is of a "routine" nature and does not require special qualification before it is implemented. For a smaller fraction of the NDT, applied regulations may impose some "prescribed" level of qualification; this is typically applicable for the more high-end NDT applications like "UT in lieu of RT" as per ASME VIII Div. 2, or NDT applied to critical asset categories (like pipeline girth weld inspection. However, conditions may exist in which NDT is in a critical role that warrants a certain level of qualification, in order to ensure that the NDT will perform as required. This may apply to NDT classed as "routine" or NDT with "prescribed" qualification.

In this DEP, an assessment process is provided that starts (3) with the selection of those NDT jobs that need further review to determine whether qualification is required. This review process is applied to all NDT jobs in a Project. It makes use of relatively simple criteria obtained from the Project and from a description in the applicable codes and standards of the scope of NDT.

In the next step, when NDT jobs have been identified for further review, guidance is provided to:

- determine the elements of the NDT System to be qualified and the thoroughness of qualification (4),*
- develop a qualification scheme (5),*
- implement the qualification.*

Further in this Section, guidance is provided on the roles and responsibilities of the organization, as well as personnel competency, to ensure that the need for qualification is properly assessed, and that the result of a qualification is an objective and independent statement of NDT capability.

2.2 ORGANIZATIONAL REQUIREMENTS

1. Qualification of NDT should be implemented in the quality systems of the organizations responsible for the manufacturing of materials and fabrication of equipment and construction of installations (called a Project).
2. For major projects, NDT should be embedded in a Quality System compliant with DEP 82.00.10.10-Gen.
3. For existing operations involved with new-built fabrication or alterations or repair, qualification of NDT should be covered by a Quality System within the Inspection or Integrity Management Department.

2.2.1 Responsibility for qualification

The Principal should assign roles and responsibilities to staff (typically in the Quality Department) to ensure that NDT used in the Project is adequately qualified, or that access can be obtained for staff to carry out the necessary NDT qualification tasks.

(Appendix A) provides guidance for specifying such roles and responsibilities.

2.2.2 Qualification included in the Quality System

The Quality System should provide a procedure specifying minimum requirements for the qualification of NDT, for types of equipment, and for types of NDT used.